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Parking payment system

The present invention is related to a parking payment system according to the preamble of
5 the claim 1 for payment of a parking fee by a terminal device of a telenetwork.

Chargeable parking squares and houses are available almost without exception in all inhab-
ited regions. Previously known are also various systems for collecting the fees for a usage
of the same. The most common systems operated today probably comprise coin meters and
10 occupied payment booths. Relating to a vehicle parking previously are known.

- Stationary payment automates, into which the payer pays the fee indicated by the
automate using money or credit card; a disadvantage of the stationary payment auto-
mates is expensiveness, small amount and sparse network, whereupon the user must
search for them, walk and return from the automate and use thus excessive time and
15 efforts for executing the payment.
- Meters placed in cars or portable ones, functioning repeatable by operating or intelli-
gent cards, from which the loaded money amount is reduced along with the use. Tho-
ugh a meter placed in car is easy to use in the payment procedure, significant weak-
nesses is following this attaining of easiness: the acquisition price of the meter is
20 costly and the loading network of payment cards used in it is sparse, whereupon the
user must use excessively time and money in order to attain this easiness for the pay-
ment procedure.
- Parking tickets to be bought beforehand and scratched upon the commissioning have
as a good characteristic relatively easy usability, but as a disadvantage poor availabil-
25 ity when needed, which means that the user must be prepared in advance for the
parking taking place in future.

A common drawback of all prior art payment systems is therefore, that the user must in one
way or another be ready beforehand, i.e. he must have coins or a credit, operating or in-

telligent card or scratchable tickets for the future parking or he must try to find parking space in an area provided with manual collection of fares or a stationary automate.

The primary object of the present invention is to reduce these disadvantages of the prior art
5 payment systems and to provide a novel parking payment system, which does not require that the user is provided in advance for parking to a chargeable parking place, house etc. with certain means of payment, as money, an operating or intelligent card or a scratchable ticket, but by which system the parking fee payment can be activated either for a desired or predetermined maximum length of time immediately and directly at the outset of the park-
10 ing.

This object has been achieved by the parking payment system for paying the parking fee according to the invention. The characteristics peculiar to the system according to the invention have been described in the enclosed protection claim.

15

The invention is therefore based on the ingenious basic perception:

- that the parking payment activation means comprises a teleterminal device signalling to the telenetwork the user identification, or by which it can be given to the network a user identification or a secret code, as e.g. a mobile station or a telecommunication
20 capable for DTMF-signalling, and
- that the service transmitter has been coupled to the network serving as a virtual remote teller terminal from the user's point of view and registering the parking fees activated by the users based on events to the user registers, therefrom the events are transferred with certain intervals for the disposal of the party offering the chargeable
25 parking space, as a city or a parking house, and for invoicing from the users, f.ex. by separate bills or in connection with the telephone invoices.

According to a particularly preferred embodiment of the invention it is advantageous for the checking of the parking fee payment that there is in the user's vehicle an identification means

indicating the use of the system, as e.g. an identification sticker, sign, bar code sticker or visually invisible and remote-readable escort memory means, by which the parking supervisor can perform the checking inquiry for the parking fee in vehicle-related way.

- 5 The advantages of the present invention include for instance, that the user will not be obliged to have in advance a payment means, as money, operating or intelligent card or a scratchable ticket, for the parking to a chargeable parking place, house etc., that the parking fee payment can be activated either for the length of the desired or predetermined maximum time immediately and directly at the outset of the parking, that the user can limit the parking
- 10 fee at the end of the parking to concern only the used parking time, that the parking can thanks to the invention be made as creditable for the user and to be invoiced with certain intervals, that the user can also receive afterwards a specification for his parkings, and that the parking fees accrued for the offerer of the chargeable parking space, as the city, can simply be revenued and also very specifically, if needed.

15

The invention will be explained in the following by some preferred adaptations with reference to the accompanying drawing, which shows schematically the parking fee system according to the invention.

- 20 The drawing shows that according to the invention the activation means for the parking fee comprises a mobile station, which is in connection through a base station with limited cover area with the cellular phone exchange MSC, transmitting the connections in a mobile station network and from it to other telenetworks and vice versa, whereby the mobile station network, e.g. an identification centre AUC or AR, home register HLR or visitor register
- 25 VLR, identifies the user, i.e. the A-subscriber, and to the mobile station network is signalled together with the A-subscriber's extension number and the selection, i.e. B-number, or the command sign string an unequivocal identification message, as:

- international subscriber identity IMSI, consisting of the mobile station subscriber's national code NMSI and the mobile station land code MCC, by which the mobile station subscriber is identified,
- mobile station subscriber's code MSIN, by which the mobile station subscriber can be identified in the operating area of the mobile station network,
- mobile station subscriber's temporary code TMSI, comprising an occasional code for the identification of the subscriber and addressed by the visitor register VLR to the mobile station subscriber,
- mobile station's international device code IMEI, by which the mobile station can be identified,

whereby the A-subscriber number and the identification code of the A-subscriber and/or the A-subscriber's mobile station form the so-called A-subscriber identity. When there is a need to certify, that the parking time of an already parked vehicle is not continued far from the vehicle, it is possible to prevent this to connect to the A-subscriber identity the information of the cell, from whose area the parking fee has been firstly activated within a certain predetermined time period.

In this connection it is recommendable at least concerning the mobile station networks to emphasise, that the invoicing registers are usually created in cellular phone exchanges MSC, and when the so-called intelligent network or IN-architecture is in use, that routing of the above-mentioned selections, particularly those requiring the IN-support, takes place through one or several IN-Service Switching Points SSP of so-called intelligent network, to which the cellular phone exchanges MSC have connection. It should also be observed that there is no hindrance to the arrangement, that all cellular phone exchanges MSC of at least digital mobile station systems, as GSM, serve as SSP. It can also be stated that this SSP can function in the telenetwork also as a router to the systems associated with the telenetwork or be in a data transfer connection with them, as for example with a customer serving system APJ, comprising usually a voice application computer CVAP (Central Voice Application Platform).

In this connection it is further advisable to underline, that a mobile station is not at all the only possible means for activation of the parking payment by the parking payment system according to the invention. As a payment activation means it can also be used terminal
5 devices of other telenetworks, as stationary wire networks, or the ones of wireless networks capable for DTMF-signalling. In this case it should however be observed that though in the connection of the A-subscriber call there is signalled in the network the A-number, any information unequivocally identifying the user is not automatically signalled in the network, wherefore and when such terminal devices are used, the parking payment system according
10 to the invention communicates with the user and asks him to introduce the user-related identification information, as for example a secret code. When there is a need to certify, that the parking time of an already parked vehicle is not continued far from the vehicle, it is possible to signal in the connection of the user-related secret code the A-number of the extension, from which the parking payment has firstly within a certain predetermined time
15 period been activated, which secret code and A-number have been predetermined in the parking payment system according to the invention to be in connection with each other.

The service transmitter is situated according to the invention to the telephone exchange PTX (Public Telephone Exchange) in the node of the common telenetwork PSTN (Public
20 Switched Telecommunications Network) or of the mobile station network MCN (Mobile Communications Network) or to the cellular phone exchange MSC (Mobile Services Switching Centre) or it is switched to this centre through a connection network and a protocol or comprises a customer serving system or APJ, consisting of the voice application computer CVAP (Central Voice Application Platform), by which communication, steering,
25 control and realisation functions associated with the services are performed, or an Intelligent Network IN. To the above-mentioned Intelligent Network belong, for instance according to the IN Conceptual Model defined by CCITT:

- Service Switching Point SSP through which a part is connected to the intelligent network or to the common telenetwork PSTN or MCN,

- Service Control Point SCP comprising the logic associated with the service control or service control functions and to which it is usually connected the Service Data Function SDF comprising among other things the customer and network data needed in the services,
- 5 - Service Management System SMS comprising the control and creation functions of the services,
- intelligent peripheral device or computer IP.

Functionally SSP comprises a part of the centre PTX or MSC or is integrated to it, identifies the IN-need and transmits the request for the IN-need to other IN-components. SSP
10 includes also the Service Switching Function SSF and the Call Control Agent Function CCAF associated with the selection of the A-subscriber. SCP controls functionally the realisation of the IN-services by giving commands for other functions, for instance SSF, CCAF, SRF and SDF, in the manner implied by the service. SMS includes the Service Management Point SMP, the Service Creation Environment Point SCEP, including further
15 the Service Creation Environment Function SCEF for defining and developing and testing of services, and the Service Management Function SMF, by which the offering and realisation of services is controlled. The intelligent peripheral device or computer IP comprises Special Resource Functions SRF, by which for instance voice notices, voice identification and voice handling are performed.

20

To the system according to the invention belongs further an identification means to be placed visibly to the vehicle at least in the parking situation, comprising the identification message desired by the party offering the chargeable parking space in visible or readable form, concerning the user's role as the user of the parking payment system and to enable the
25 performance of the payment control or request. As a user identification it can be used:

- number or sign series to be distributed to the public through different distribution channels, as booths or gas stations, whereby it is possible to check paid payments in the payment control, where a usual mobile station can function as the control device, by entering the number or sign series in question to the parking payment system ac-

according to the invention, whereat the controller receives as a response of the entry a message to the control device indicating, whether the user has paid the parking fee or not,

- an identification logo, whereby the vehicle's register number or its part serves as the user identification and the payments paid by the control device in the payment control, e.g. a mobile station, can be checked for example by introducing the vehicle's register number or correspondingly its part to the parking payment system according to the invention, whereby the controller receives as a response of the entry to the control device a message indicating, whether the user has paid the parking payment or not, as a bar code, and by the bar code reader an inquiry is activated to the parking payment system according to the invention and as a response of the inquiry the controller receives a notice indicating, whether the user has paid the parking payment or not.
- or a visually invisible remote-readable escort memory, by which an inquiry can be activated by remote-reading to the parking payment system according to the invention, whereby as the response of the inquiry the controller receives a notice indicating, whether the user in question has paid the parking fee or not,

When the A-subscriber joins as the user of the parking payment system according to the invention, the A-subscriber dials a selection to the service number according to the invention by the mobile station used by him for the paying of the parking payments in the future, whereby to the parking payment system is signalled together with the extension number of the A-subscriber an unequivocal identification message, as:

- the international subscriber identity IMSI consisting of the national code NMSI of the mobile station subscriber and the national code MCC of the mobile communications, by which the mobile station subscriber is identified,
- the mobile station subscriber's code MSIN, by which the mobile station subscriber can be identified in the operational area of the mobile station network,
- the mobile station subscriber's temporary code TMSI, comprising an occasional code addressed by the visitor register VLR to the mobile station subscriber for identification of the subscriber.

- the mobile stations international device code IMEI, by which it is possible to identify the mobile station,
- whereby the A-subscriber number and the identification code of the A-subscriber and/or the A-subscriber's mobile station form the so-called A-subscriber identity. If the person desiring to become a user has not a mobile station at his or her disposal and he or she wants to join as the user of the parking payment system according to the invention, he takes connection from any tele subscription to the service number of the parking payment system according to the invention, because when the parking payment system does not get unequivocal identification information, a connection takes place with the community maintaining the parking payment system, whereby the identity of the person desiring to become a user and the tele extension number at his disposal are certified and to the user it is given an individual secret code always to be bestowed in connection with the activation of the parking payment, whereby this secret code is given with the A-subscriber's tele subscription number selected in connection with the activation of the parking payment, so that the secret code and the selected A-subscriber's tele subscription number function in connection with the activation of the parking payment as the A-subscriber identity identifying the user.

As response to the A-subscriber identity the parking payment system according to the invention creates in the IP-center belonging to it and/or to the data base SDF (Service Data Function) in the CVAP or in data communication to it and/or DB (Data Base) a user-related register ASR (A-Subscriber Register) corresponding the A-subscriber identity, into which register the parking payment system according to the invention records further on the user's parkings.

- 25 After the ASR-register has been created, the parking payment system according to the invention connects as an inquiry and/or payment control key for the ASR-register a user identification comprising:
- the above-mentioned number or sign series given by the user to the parking payment system according to the invention or the register number(s) of the vehicle(s) or its or

their parts, when the user has several vehicles, whereby it is preferable to record them under the number selection 1, 2, 3 ... for easiness of use,

- response data of the bar code or the remote-readable escort memory introduced by the community maintaining the parking payment system according to the invention,
5 e.g. as the teleoperator.

After the creation of the ASR-register and its inquiry and/or payment control key the parking payment system according to the invention is completed. When the user dials the predetermined selection to the network centre PTX or MSC, the user is either identified automatically by the telenetwork or identifies himself by giving the secret code, when requested.

- 10 The communication system takes care of the signalling associated with the connection, comprising the signalling according to for example the standard SS7, TUO, ISUP, TCP-IP, X-400, X-500, X-25 or similar protocol in the connection between the IP-centre/APJ-system and the centre PTX or MSC. The predetermined selection has advantageously the form *RABCD* or RABCD. The selection *RABCD*, which is used preferably in connection with the IN-realisation, has as the consequence instead of the call an activation function
15 and the parking payment system confirms the payment as a brief message communication to the A-mobile station, but when the user dials the selection RABCD, which is preferably used in connection with the APJ-realisation, the consequence of the selection comprises a call, whereby the user communicates with the parking payment system and gets a confirmation
20 for the payment registration from it, when the call is heard as a voice. In the above-mentioned predetermined selection:

- R means the connection or identification number of the parking payment system, having the length of 3-5 numbers, e.g. 153,
- A means the starting/ending code of the parking and is correspondingly either 1 or 0,
- 25 - B means the code of the city, community etc. offering the parking space or area, with the length of 1-3 characters, e.g. 01,
- C means the code of the price group of the parking space with the length of 1-2 characters, which is not needed to be introduced, if the parking space or area is equal everywhere, e.g. 1,

- D means the parking time with the length of 1-2 characters, which is not needed to be introduced, whereby neglecting the introduction means, that the parking payment system enters the payment to concern automatically the maximum parking time, but for example the selection 1, 2, 3 or 4 means correspondingly 1, 2, 3 or 4 hour's parking time.

5 In this connection it is advisable to emphasise, that the parking payment system according to the invention certifies also before the payment registration that the user is entitled to use the system. If there is not right for usage, the system gives a notice either as a brief message communication or as a voice, that it has not been possible to register the payment. When the user wants to stop the parking before the ending of the maximum parking time according to the assumption value or the selected parking time, he dials the predetermined parking interruption selection R0.

15 According to the description above for instance in Helsinki in the first payment zone a parking of one hour can be activated by the teleterminal device for example by selecting either *153101111* or 15310111 and the same parking can be activated e.g. after 15 minute - 1/2 hour parking to end for instance by selecting either *1530* or 1530, whereby only the actual parking time of 15 minutes - 1/2 hour is recorded to the ASR-register.

20 The invention has been described above only by some preferred adaptations. It is to be understood, that the purpose of this description is not to limit the scope of the invention and as a person skilled in the art can understand, many modifications, complementary additional features or alternative solutions are possible within the scope defined in the accompanying protection claim.

25

It must additionally be stated, that the main principle of the invention can be adapted also to parking automates, so that the user without a mobile station activates his or her parking by showing his optionally remote-readable parking card to the payment automate switched to

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the parking system according to the invention, and the parking payment in the area in question is activated.

Claims

1. Parking payment system for paying of the parking payment by a terminal device of a telenetwork, characterized in that
- 5 - the teleterminal device used for paying the parking payment comprises either a mobile station signalling to the telenetwork (MCN) a user identification, preferably the identification message of the A-subscriber number and the A-subscriber and/or the A-subscriber's mobile station, forming the A-subscriber identity, or a teleterminal device capable for DTMF-signalling, which can give to the network (PSTN, MCN) as a user
- 10 identification a secret code forming the A-subscriber identity or being a part of it; and
- to the telenetwork (PSTN, MCN) is switched a service transmitter (IN, APJ), having or to which is connected a database (DB, SDF) and functioning as a virtual remote cash terminal and recording the parking fees activated by the users to the database's user-related registers (ASR) according to the subscriber identity.
- 15
2. Parking payment system according to claim 1, characterized in that there is in the user's vehicle an identification means showing the operational status of the system, as for instance an identification sticker, sign, bar code sticker or a visually invisible and remote-readable escort memory means, by which the parking supervisor can make from the
- 20 database (DB, SDF) a vehicle-related certification inquiry of the parking payment, or by which bar code or escort memory means the user can activate the parking fee payment to the parking automate.
3. Parking payment system according to claim 1 and/or 2, characterized in that it is
- 25 ready for use after the creation of the service transmitter's (IN, APJ) ASR-register and its inquiry and/or payment control key.
4. Parking payment system according to claim 1,2 and/or 3, characterized in that in this parking payment system the user dials a predetermined selection to the network centre

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(PIX or MSC), whereby the user is either identified by the telenetwork automatically or he identifies himself by giving a secret code, if requested.

- 5 5. Parking payment system according to claim 1, 2, 3 and/or 4, characterized in that a communication system takes care the signalling associated with the connection, comprising in the connection between the IP-centre/APJ-system and the centre PTX or MSC performed signalling preferably known in itself and according to the standard SS7, TUP, ISUP, TCP-IP, X-400, X-500, X-25 or similar protocol.
- 10 6. Parking payment system according to claim 1, 2, 3, 4 and/ or 5, characterized in that the predetermined selection takes preferably place in the form *RABCD* or RABCD, whereby the selection *RABCD* is used in connection with the IN-realisation, resulting instead of a call to activation function, and the parking payment system confirms the payment registration as a brief message communication to the user's mobile station, and the
- 15 selection RABCD is used by the APJ-realisation, resulting to a call, in which the user communicates with the parking payment system and receives from it the payment registration confirmation during the call as a voice.
7. Parking payment system according to claim 6, characterized in that in the predetermined selection:
- 20
- R means the connection or identification number of the parking payment system, having the length of 3-5 numbers, e.g. 153,
 - A means the starting/ending code of the parking and is preferably either 1 or 0,
 - B means the code of the city, community etc. offering the parking space or area, with

25 the preferable length of 1-3 characters, e.g. 01,

 - C means the code of the price group of the parking space with the preferable length of 1-2 characters, which is not needed to be introduced, if the parking space or area is equal everywhere, e.g. 1,

- D means the parking time with the preferable length of 1-2 characters, which is not needed to be introduced, whereby neglecting the introduction means that the parking payment system enters the payment to concern automatically the maximum parking time, but for example the selection 1, 2, 3 or 4 means correspondingly 1, 2, 3 or 4 hour's parking time.

8. Parking payment system according to claim 1, 2, 3, 4, 5, 6 and/or 7, characterized in that the parking payment system confirms prior to the payment registration that the user is entitled to use the system, and if no right exists, the system gives either as a brief communication or as voice a notice, indicating that it has not been possible to register the payment.

9. Parking payment system according to claim 1, 2, 3, 4, 5, 6, 7 and/or 8, characterized in that in order to interrupt the parking before the maximum parking time according to the assumption value or the selected parking time period has elapsed, a predetermined parking interruption selection, e.g. RO, will be sent by the teleterminal device.

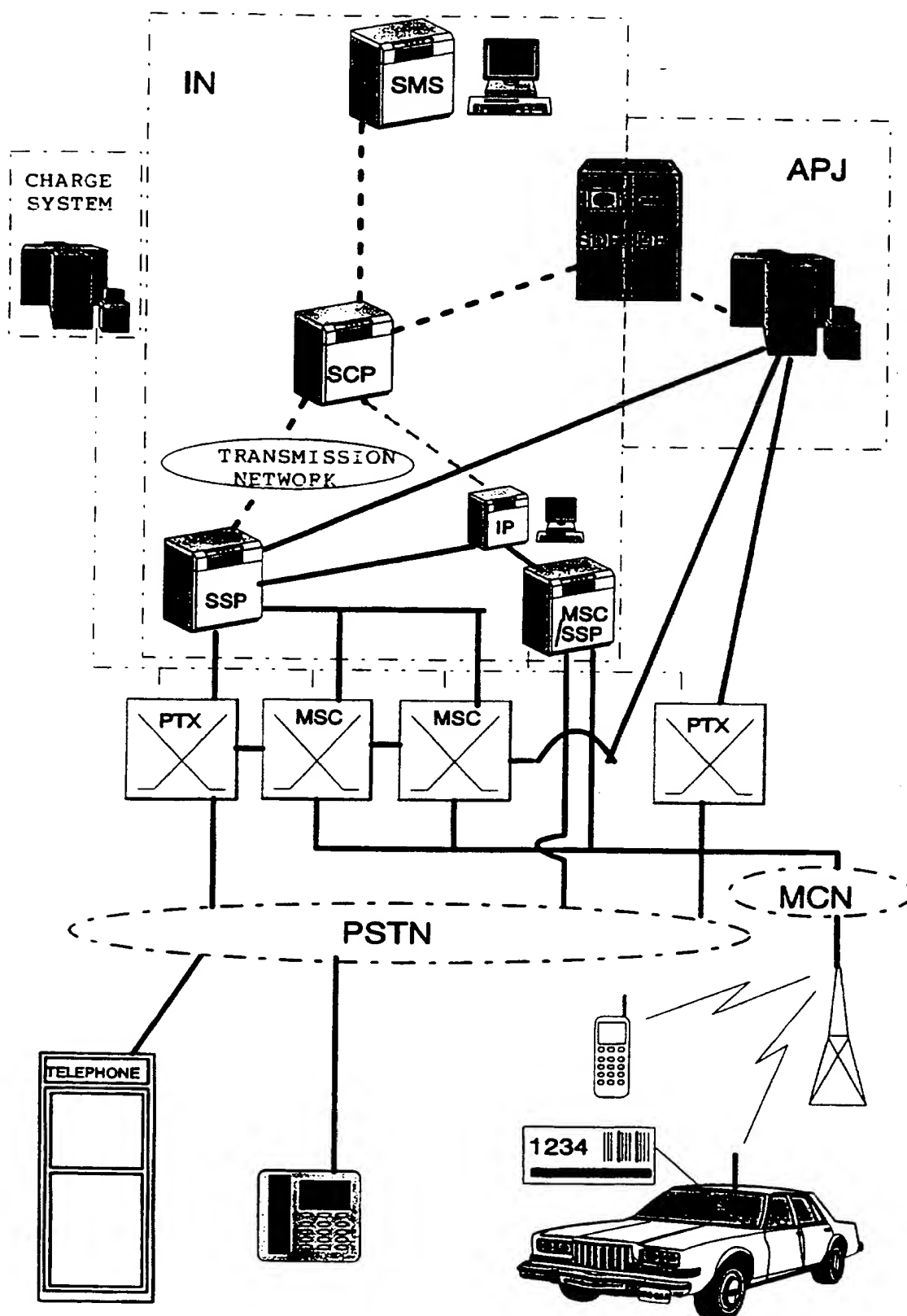


FIG.

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INTERNATIONAL SEARCH REPORT

International application No.
PCT/FI 96/00223

A. CLASSIFICATION OF SUBJECT MATTER

IPC6: G07C 1/30, H04Q 7/22 // G07F 17/24
According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

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Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

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C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 9320539 A1 (JONSSON, TOMMY), 14 October 1993 (14.10.93), page 2, line 35 - page 3, line 18; page 4, line 6 - line 25 --	1-9
P,X	WO 9611453 A1 (PARKIT OY), 18 April 1996 (18.04.96), page 3, line 19 - page 4, line 14 --	1-9
A	WO 8401073 A1 (KATZEFF, KURT), 15 March 1984 (15.03.84), page 2, line 20 - page 3, line 12 --	1-9
A	WO 9411849 A1 (VATANEN, HARRI, TAPANI), 26 May 1994 (26.05.94), page 8, line 7 - line 21 -- -----	1-9

☐ Further documents are listed in the continuation of Box C. ☒ See patent family annex.

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Date of the actual completion of the international search

11 Sept 1996

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INTERNATIONAL SEARCH REPORT
Information on patent family members

31/07/96

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Patent document cited in search report	Publication date	Patent family member(s)	Publication date
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